IPC Series

FLAT PANEL DISPLAY
For PanelLink

IPC-DT/L40S(PC)T
IPC-DT/H40X(PC)T

User's Manual

CONTEC CO.,LTD.

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1. Introduction

The IPC-DT/L40S(PC)T and IPC-DT/H40X(PC)T are TFT color liquid crystal displays (LCDs) to be used with host computers such as the CONTEC IPC Series and SBCs (single-board computers).

Features

- Full-bright, wide-angle-of-visibility type of liquid crystals capable of displaying up to 262,144 colors
- Touch panel enables mouse-style keyboard-less operation.
- Panel Link Interface allowing a cable of up to 5 m in length to be used
- Thin panel unit has a mounting depth of only 38mm (when input directly to 5VDC terminal)
- Back-mounted, dedicated power supply unit [IPC-POA100D] available as an option, enabling the LCD to be used with an AC power supply
- Equipped with a connector for remote control to get the full benefit of the LCD
- Front structure with IP65-compliant ingress protection

* For the host computer to be used with the display or its options, contact your local CONTEC branch or sales office.

Limited One-Year Warranty

CONTEC Products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization Number (RMA) from the CONTEC group office where you purchased before returning any product.

*** No product will be accepted by CONTEC group without the RMA number.**

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Handling Precautions

Take the following precautions when handling this board.

- This display is made of the precise electric parts, so do not use or store it in the vicinity of impulse or vibration.
- Do not use or store the product in a location exposed to extremely high or low temperature or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
  - In the vicinity of a heat source
- There are switches and jumpers on the board that need to be set in advance. Be sure to check these before installing to the expansion slot. Only set the switches and jumpers on the board to the specified settings. Otherwise, the product may cause a failure.
- Do not use the product in extremely humid or dusty locations.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If you utilize this product in such usages where high reliability and safety are required as on the trains, vessels, automotives or crime- or disaster-prevention devices, contact your retailer.
- Do not use touch panel key operations to initiate actions where there is a risk of loss of life or serious injury. Ensure that the system design can handle the case when a key is pressed by mistake.
- Do not use any sharp-pointed object such as a mechanical pencil to touch the touch panel. Doing so may scratch the touch panel, resulting in malfunctions.
- Do not subject the touch panel to shock as doing so may break it.
- Do not modify the product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.
- Use the power supply intended for use with this unit whenever possible. If using a power supply other than the intended power supply, ensure that it satisfies the required voltage and maximum current ratings.
- Never disconnect the display cable when the host computer is turned on. To avoid damage to the display, turn off the computer before inserting or disconnecting the display cable.
- In the event of failure or abnormality, contact your retailer.

- When the surface or frame of the touch panel has become dirty, wipe it with neutral detergent. Do not wipe the touch panel with thinner, alcohol, ammonia, or a strong chlorinated solvent. Use a protective sheet (available as an option) if the touch panel is used where it can easily collect dust and dirt.
- This display does not support the OS other than the following OS. Windows 2000 Professional, Windows NT 4.0 Workstation, Windows 98 Second Edition
- A characteristic of analog touch panels is that the detected position may vary due to changes in the ambient environment (temperature and humidity) and changes in resistance values over time. In such cases, the touch panel should be recalibrated and the calibration data updated.
- LCD display may have some pixels being dropped (bright and black spots) below a certain threshold.
  Note that this is not a failure or a defect.
- Regular maintenance is necessary for the backlight on the touch panel and the display for the longevity parts.

Burn-in on TFT Display

- "Burn-in" may occur if the same display is retained for a long time. Avoid this by periodically switching the display so that the same display is not maintained for a long time.

* Burn-In---Phenomenon characterized by a TFT display as a result of long-time display of the same screen where a shadow-like trace persists because electric charge remains in the LCD element even after the patterns are changed.

- Component Life

(1) backlight--- The operating lifetime of the backlight is at least seven years. (Brightness reduced to 50% of original, assuming continuous operation at 25 degrees centigrade, Utilization rates 18 hours/one)

(2)Touch panel--- The operating lifetime of the touch panel is at least 1 million touches (as tested by mechanical touching under 300g of force at a rate of two presses per second).

* CONTEC accepts your request for replacing each consumable in the PANECON-PC as a request forrepair (at an additional cost). Contact your local retailer or CONTEC sales office.

FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

2. Specifications

Function Specifications

Table 2.1. Function Specifications

Item		Specification	
		IPC-DT/L40S(PC)T	IPC-DT/H40X(PC)T
Assembly type		Panel mounted	
Screen size		12.1 inches	15 inches
Number of pixels		800 x 600 dots	1024 x 768 dots
Display type		TFT color LCD	
Number of colors		262,144 colors	
Brightness control		Provided by software and hardware (Remote control cable connector on the back)	
Backlight control		Provided by software and hardware (Remote control cable connector on the back)	
Cable length		2m or 5m (use the special-purpose display cable sold separately.)	
LCD interface		20-pin MDR connector (Panel Link Interface used) *1	
Power supply interface		4-pin nylon connector for +5 VDC power supply (Input at 85 to 264 VAC is enabled by using the back-mounted, optional power supply unit [IPC-POA100D].)	
Touch panel	Resolution	4096 x 4096 (Emulated in 800 x 600)	4096 x 4096 (Emulated in 1024 x 768)
	Detection method	Resistive-layer analog method	
	Touch life expectancy	The operating lifetime of the touch panel is at least 1 million touches (as tested by mechanical touching under 300g of force at a rate of two presses per second)	
	Touch panel interface	20-pin MDR connector on the back (shared with display signals)	
Power consumption		3.3A Max. at +5 VDC±5%	4.0A Max. at +5 VDC±5%

*1 : When used for output to the LCD, the CONTEC IPC or SBC series requires a converter such as the LCD signal conversion unit [ADPLNK(PC)H] depending on the model of the host. Check this out before purchase.

General Specifications

Table 2.2. General Specifications

Condition			Specification	
			IPC-DT/L40S(PC)T	IPC-DT/H40X(PC)T
Environment				
	Ambient operating temperature		0 - 50°C	
	Ambient storage temperature		-10 - 60°C	
	Ambient humidity		10 - 90%RH (No condensation)	
	Floating dust		Normal	
	Corrosive gas		None	
	Noise resistance	Line noise	AC line: 2 kV, Signal line: 1 kV (IEC1000-4-4Level3, EN61000-4-4Level3) (Host: IPC-BX/M600(PCW), Power supply: IPC-POA100D)	
		Electrostatic withstanding voltages	Contact: 4 kV (IEC1000-4-2 Level 2, EN61000-4-2 Level 2) Airborne: 8 kV (IEC1000-4-2 Level 3, EN61000-4-2 Level 3) (Host: IPC-BX/M600(PCW), Power supply: IPC-POA100D)	
	Vibration resistance	Sweep durability	10 - 50 Hz/Single-side amplitude or 0.15 mm 50 - 500 Hz/2.0 G in the X/Y/Z directions for 23 minutes each (Conforming to JIS C0040 and IEC68-2-6)	
		Fixed-vibration durability	16.7 Hz/2 G in the X/Y/Z directions for 30 minutes each (Conforming to JIS C0040 and IEC68-2-6)	
	Shock resistance		10 G in the X/Y/Z directions for 11 ms; Half-sine wave (Conforming to JIS C0041 and IEC68-2-27)	
Structure				
	Major dimensions (mm)		370(W) x 40.4(D) x 307(H)	428(W) x 40.4(D) x 336(H)
	Panel cut dimensions (mm)		344±0.5(W) x 281±0.5(H) (12 stud holes are required on the periphery.)	398±0.5(W) x 306±0.5(H) (12 stud holes are required on the periphery.)
	Weight		About 4.0 kg (*2)	About 5.0 kg (*2)
	Ingress protection		Front part conforming to IP65	

*2: The weight includes neither cables nor the optional power supply.

Optical Display Specifications

Table 2.3. Optical Display Specifications

Item	Condition			Specifications	
				IPC-DT/L40S(PC)T	IPC-DT/H40X(PC)T
Visual angle (Up/Down)	CR≥10	ϕ = 180°	Display in monochrome	50deg	50deg
		ϕ = 0°		70deg	60deg
Visual angle (Right/Left)		ϕ = +90°		70deg	75deg
		ϕ= -90°		70deg	75deg
Surface brightness (at center) *1	Display in white			350cd/m^2 (Typ.)	250cd/m^2 (Typ.)

*1 Surface brightness is a numerical value in a display simple substance. The brightness that let the touch panel pass serves as about 77% of the above-mentioned numerical value.

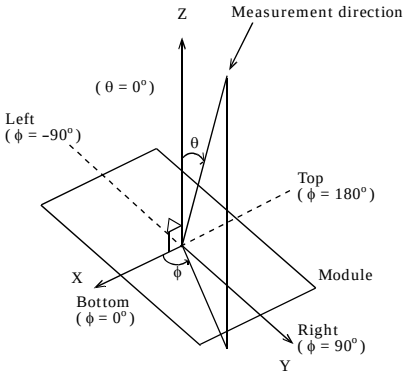


Figure 2.1. Viewing Range Definition

Note!

The above optical specification data shows optical characteristics of the liquid crystal in the display; the data does not represent the actual view on the display or its viewing angles.

3. Outside Dimensions and Part Names

Outside Dimensions

IPC-DT/L40S(PC)T

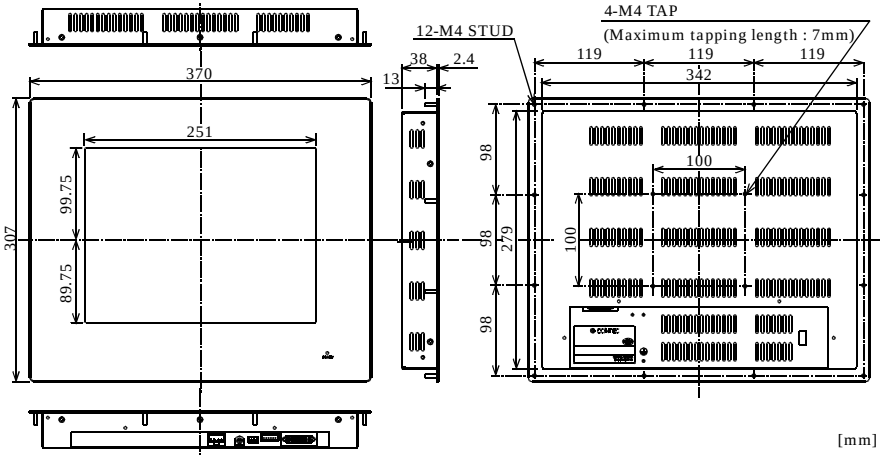


Figure 3.1. Outside Dimensions of Main Unit (IPC-DT/L40S(PC)T)

IPC-DT/H40X(PC)T

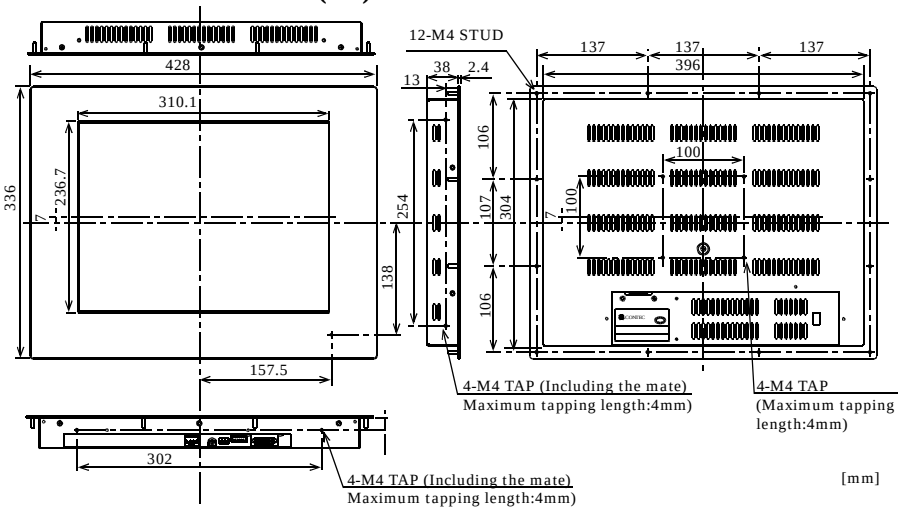


Figure 3.2. Outside Dimensions of Main Unit (IPC-DT/H40X(PC)T)

IPC-DT/L40S(PC)T with IPC-POA100D (power supply unit)

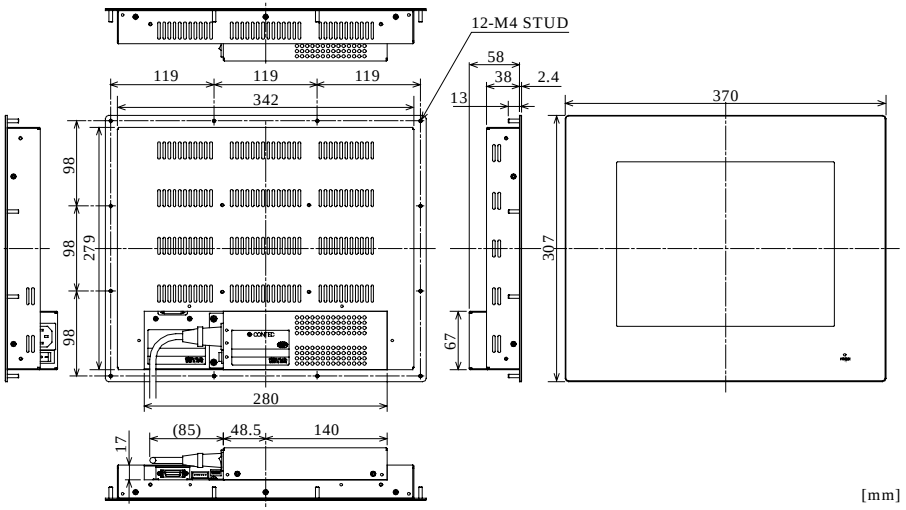


Figure 3.3. Dimensions of IPC-DT/L40S(PC)T with IPC-POA100D

IPC-DT/H40X(PC)T with IPC-POA100D (power supply unit)

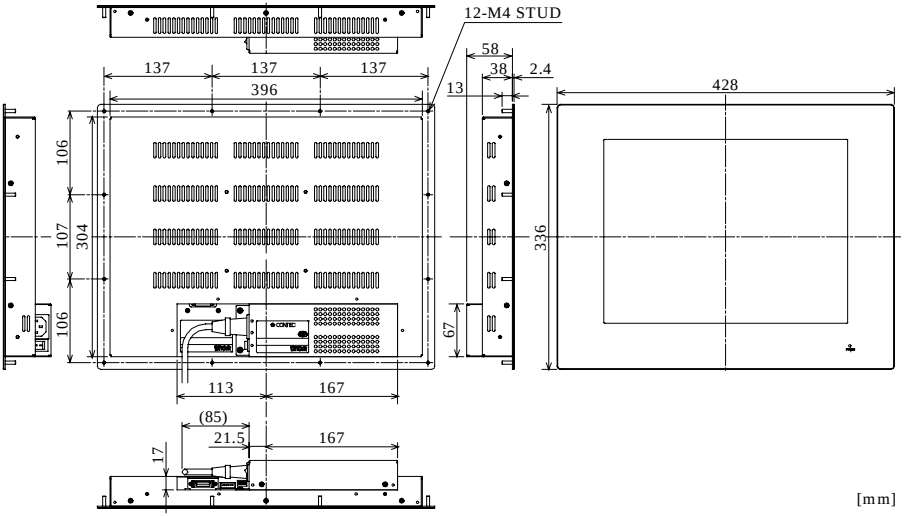


Figure 3.4. Dimensions of IPC-DT/H40X(PC)T with IPC-POA100D

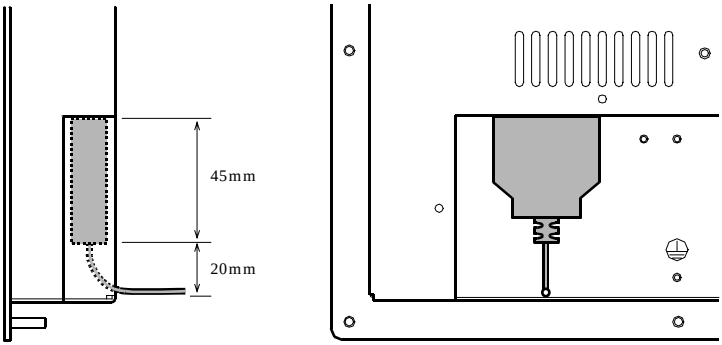


Figure 3.5. Cable Bend Dimension

Part Names

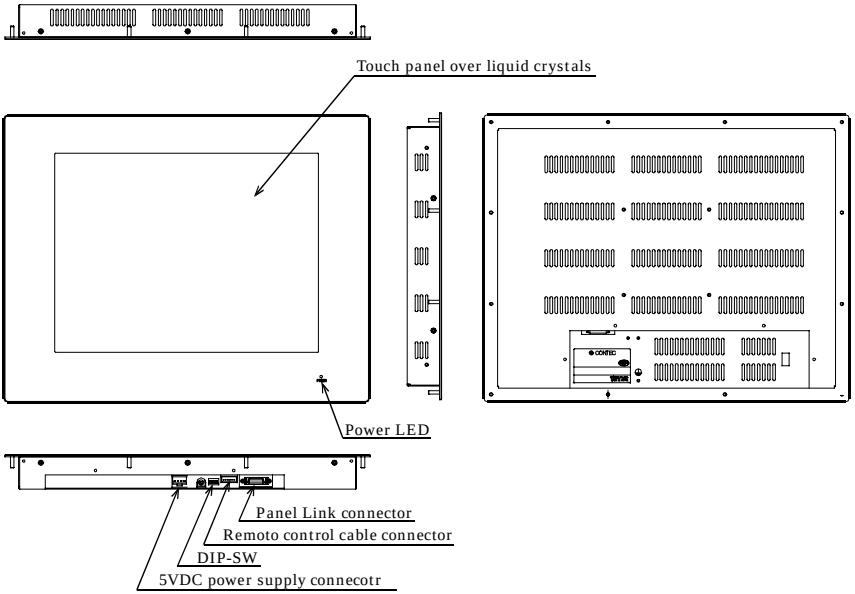


Figure 3.6. Part Names (IPC-DT/L40S(PC)T and IPC-DT/H40X(PC)T)

4. Setting the Display

Be sure to check the following settings before using the display.

Setting the DIP switch

The display has a DIP switch (an array of built-in switches) on the back. For normal use of the display, leave all of the built-in switches at the OFF positions (as factory-set). The table below shows the functions of the built-in switches.

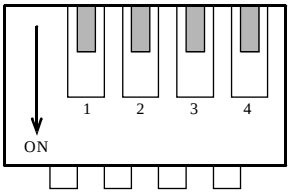


Figure 4.1. DIP Switch

Table 4.1. DIP Switch Settings

No.	ON/OFF setting	Function
1	OFF (Factory setting)	Enable the display built-in buzzer to sound upon a touch on the touch panel. (The buzzer ON/OFF setting can also be controlled by driver software.)
	ON	Disable the display built-in buzzer from sounding upon a touch on the touch panel. (The buzzer ON/OFF setting can also be controlled by driver software.)
2	OFF (Factory setting)	Use a host other than below.
	ON	Use an SBC board PC-686C(PC)H-LV , -LVS IPC-BX/M620(PCW) Series, or IPC-BX/M630(PCI) Series.
3	OFF (Factory setting)	No function
	ON	No function
4	OFF (Factory setting)	No function
	ON	No function

Notes!

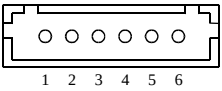
- *The buzzer is disabled by setting the DIP switch (built-in switch No. 1 to ON).*
- *Set built-in switch No. 2 depending on the host product to be used with the display.*

Specifications of Remote Control Cable Connector

The display has the remote control cable connector on the back. Given below are the pin assignments on the connector and an example of using it.

Table 4.2. Remote Control Cable Connector

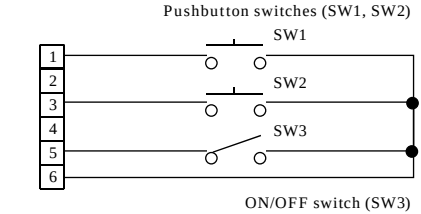
Connector type	Cable connector (Side type)
Model	S6B-XH-A(LF)(SN)(mfd. by JST)



Pin No.	Signal name
1	Brightness UP
2	GND
3	Brightness DOWN
4	GND
5	Backlight ON/OFF *1
6	GND

*1 : The backlight remains off while the backlight ON/OFF signal has the GND level.

Connector application example



Connector model: XHP-6 (JST)

Figure 4.2. Connector Application Example

Notes!

- *Applying a GND-level voltage to the brightness UP or DOWN signal increases or decreases the brightness.*
- *The brightness remains unchanged if the two signals (brightness UP and DOWN signals) are input at the same time.*
- *The remote control cable is not bundled with this product.*

5. Installation Procedure

(1) Cut a panel in the following dimensions for installing the display.
The four corners of the solid-line rectangle define the panel cut dimensions. The holes (12) on dashed lines represent stud holes.

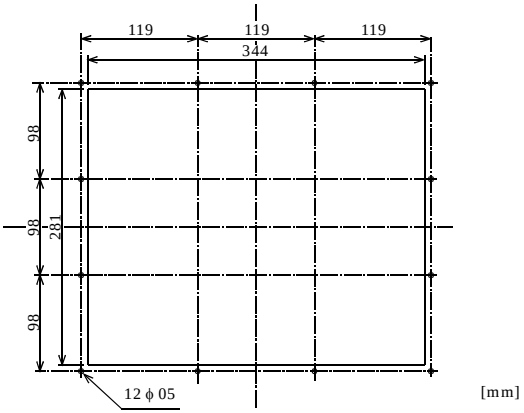


Figure 5.1. Display Mounting Position (IPC-DT/L40S(PC)T)

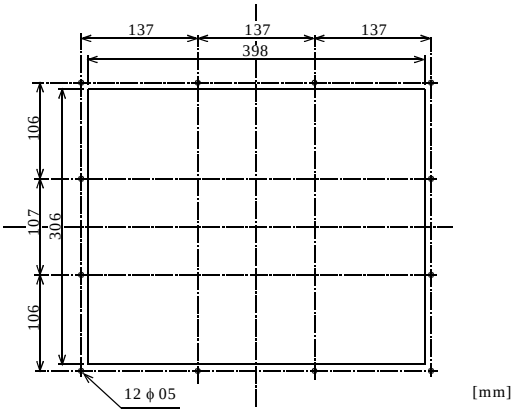


Figure 5.2. Display Mounting Position (IPC-DT/H40X(PC)T)

(2) Insert the supplied gasket between the panel and the display, then fasten them together with M4 nuts as shown below.

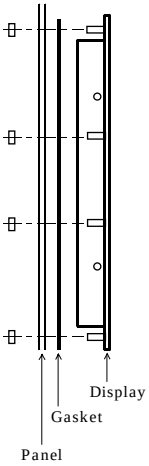


Figure 5.3. Assembling Method

Note!

The panel must be up to 10 mm in thickness.

6. Connection to the Host Computer and Power Supply

If using IPC or SBC products other than those listed here, refer to their respective manuals for details of the settings.

Setting up the Host Computer

The IPC-DT/L40S(PC)T and IPC-DT/H40X(PC)T can be used with host computers such as the CONTEC IPC Series and SBCs (single-board computers). The host computer to be connected must be set up correctly for using the display. Set the IPC-DT/L40S(PC)T to SVGA (800 x 600) or the IPC-DT/H40X(PC)T to XGA (1024 x 768).

Set the LCD type as follows depending on the host computer to be used.

PC-686BX(PC)-LV

To use this SBC board with the display, set the on-board switch (U2) as shown below.

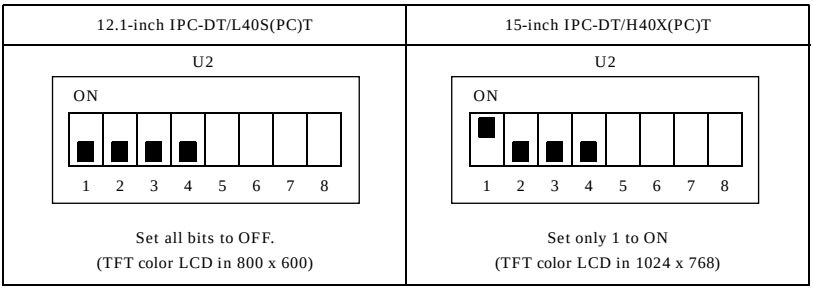

12.1-inch IPC-DT/L40S(PC)T
15-inch IPC-DT/H40X(PC)T
U2
ON
1 2 3 4 5 6 7 8
Set all bits to OFF.
(TFT color LCD in 800 x 600)
U2
ON
1 2 3 4 5 6 7 8
Set only 1 to ON
(TFT color LCD in 1024 x 768)

Figure 6.1. U2 Switch Settings

Note!

Use this board along with the ISA bus type of LCD signal conversion board [ADPLNK(PC)].

PC-686C(PC)-LV or -LVS

Since this SBC board is Plug and Play compliant, there is no need to set up the host computer.

Instead, set the DIP built-in switch No. 2 to ON. (See Chapter 4.)

Note!

Use this board along with the 26/20-pin conversion cable [IPC-PL2620-002/C].

PC-686E(PC)-LV

To use this SBC board with the display, set the on-board rotary switch as shown below.

Table 6.1. PC-686E(PC)-LV

12.1-inch IPC-DT/L40S(PC)T	15-inch IPC-DT/H40X(PC)T
Setting No. = 0 (TFT color LCD in 800 x 600)	Setting No. = 1 (TFT color LCD in 1024 x 768)

Note!

Use this board along with the ISA bus type of LCD signal conversion board [ADPLNK(PC)].

PC-586U(PC)-LV or -LVS

To use this SBC board with the display, set the on-board switch (S2) as shown below.

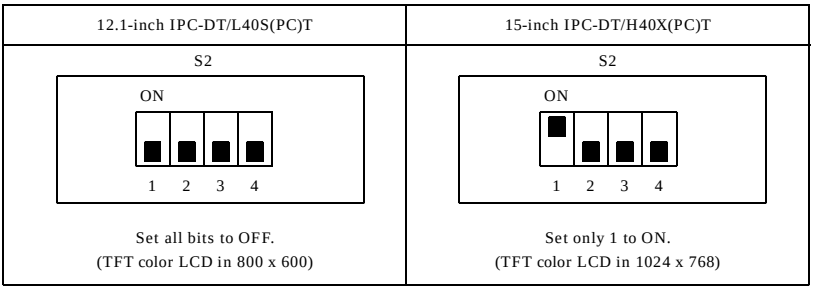


Figure 6.2. S2 Switch Settings

Note!

Use this board along with the LCD signal conversion mini-board [EXLCD68] and the ISA bus type of LCD signal conversion board [ADPLNK(PC)].

PC-586HU(PC)-LV

To use this SBC board with the display, set the on-board jumper (JP8) as shown below.

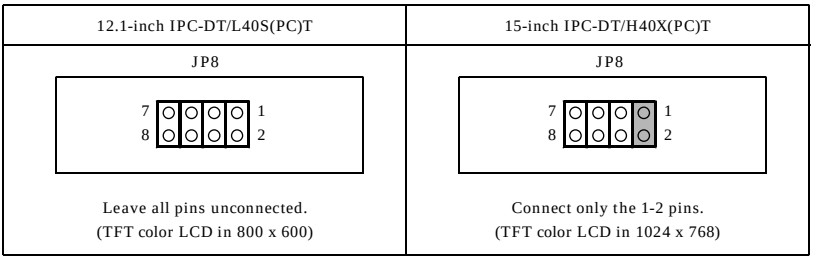


Figure 6.3. JP8 Setting

Note!

Use this board along with the ISA bus type of LCD signal conversion board [ADPLNK(PC)].

IPC-BX/M600(PCW)

To use this box computer with the display, set the on-board switch (S1) as shown below.

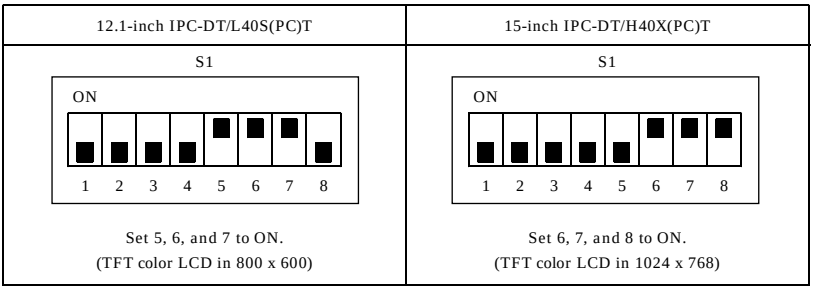

12.1-inch IPC-DT/L40S(PC)T
15-inch IPC-DT/H40X(PC)T
S1
ON
1 2 3 4 5 6 7 8
Set 5, 6, and 7 to ON.
(TFT color LCD in 800 x 600)
S1
ON
1 2 3 4 5 6 7 8
Set 6, 7, and 8 to ON.
(TFT color LCD in 1024 x 768)

Figure 6.4. S1 Switch Settings

Connection Example

Illustrated below is an example of connecting the display to the box computer [IPC-BX/M600(PCW)C, CP].

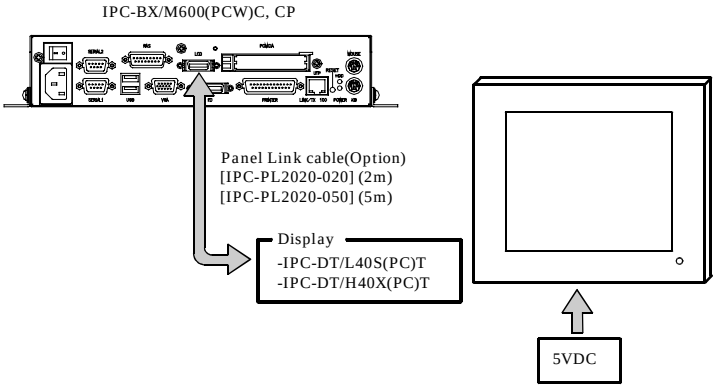


Figure 6.5. System Configuration

Power Supply

The display operates at 5VDC. For the supply voltage, use a power supply satisfying at least the capacity defined in the Specifications.
Turn the 5VDC supply On in accordance with the following sequence.

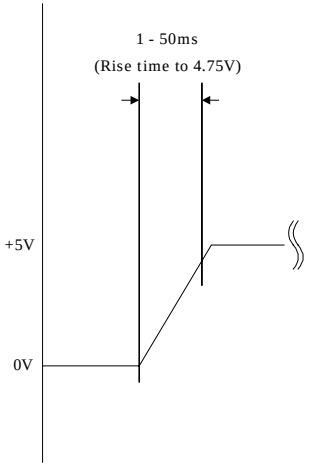


Figure 6.6. Power On Sequence

Table 6.2. Power Supply Connector

Connector type	5VDC input connector
Model	B4PS-VH(LF)(SN)(mfd. by JST)
Pin No.	Signal name
1	GND
2	GND
3	+5V
4	+5V

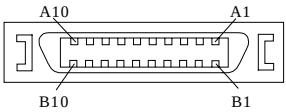
■Applicable power cable connector
Housing: VHR-4N (manufactured by JST)
Contact: SVH-21T-1.1(LF)(SN)(AWG22 - 18)
(manufactured by JST)

Although the display operates at 5VDC, the dedicated 5VDC output AC power supply [IPC-POA100D] is available as an option so that the display can be used with an AC power supply.

Panel Link Connector Specifications

The display is equipped with the Panel Link Interface. The table below lists the pin specifications of the Panel Link connector on the back of the display.

Table 6.3. Panel Link Connector

Connector type	Panel Link Interface connector(CN3)		
Model	N10220-5DG3 PL(mfd. by 3M)		
			
Pin No.	Signal name	Pin No.	Signal name
A1	TX0-	B1	TXC-
A2	TX0+	B2	TXC+
A3	TX0 SHIELD	B3	TXC SHIELD
A4	TX2 SHIELD	B4	TX1 SHIELD
A5	TX2-	B5	TX1-
A6	TX2+	B6	TX1+
A7	DDC/SCL	B7	N.C.
A8	DDC/SDA	B8	SENS
A9	TXD(HOST)	B9	N.C.
A10	RXD(HOST)	B10	GND

7. Touch Panel

The IPC-DT/L40S(PC)T) and IPC-DT/H40X(PC)T is equipped with a quick response touch panel which enables keyboard-less, mouse-less operations using the serial interface (RS-232C) with the host computer.

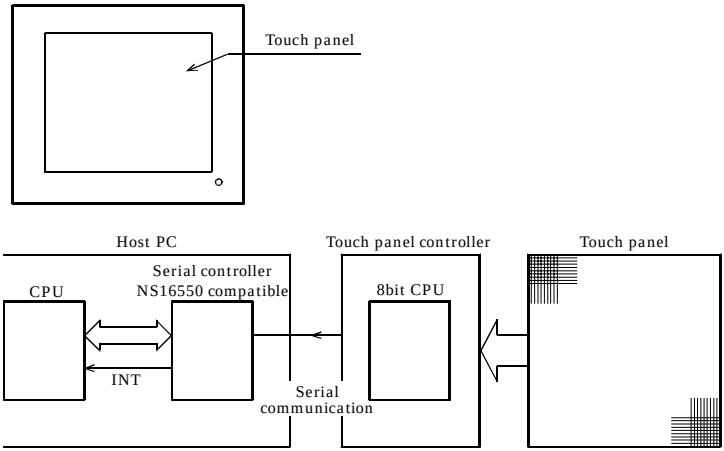


Figure 7.1. Touch Panel and Block Diagram

Data input at the touch panel is processed by the touch panel controller and passed to the host PC via the serial port on the CPU in the controller.

Before the touch panel can be used, touch panel driver software (TPBK(PC)S) must be installed. Note that the driver software is not bundled with this product. Use the one (to be) downloadable from the CONTEC's home page or the one included on the driver software CD-ROM (IPC-SLIB-01) available as an option (separately priced). The CD-ROM need to be purchased separately.

The touch panel driver supports Windows 95, 98, NT4.0, and 2000.

For further details, refer to the READ_ME file for each driver.

Communication format

- Baud rate 9600
- Data length 8 bits
- Parity Even parity
- Stop bit 1 bit

8. Options

Double-sided screen protective sheets

- IPC-CV12 : (12.1-inch screen protective sheets: 10 sheets)
- IPC-CV15 : (15-inch screen protective sheets: 10 sheets)

Driver

- IPC-SLIB-01 : Driver & Utility Soft Set(CD-ROM version)

Power unit

- IPC-POA100D : 100V to 240VAC power unit
- IPC-POD24/5 : 24VDC input power unit

LCD I/F board

- ADPLNK(PC)H : Panel Link I/F board for SBC(ISA bus)

Optional cables

- IPC-PL2020-020 : Panel link cable (2 m)
- IPC-PL2020-050 : Panel link cable (5 m)
- IPC-DVIPL-020 : DVI - panel link conversion display cable (2m)
- IPC-DVIPL-050 : DVI - panel link conversion display cable (5m)

IPC-DT/L40S(PC)T

IPC-DT/H40X(PC)T

User's Manual

IPC-DT/x40x-HMU

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